CLAIMS

1. A contact inspection method for inspecting vibration conditions of a magnetic disk (1), a slider (2) and a suspension (4), based on detection outputs from a detection element (12) attached to the magnetic disk (1) and a detection element (12b) attached to the slider (2), the magnetic disk (1) being rotatable, the slider (2) having a head for performing at least one of recording and reproduction on and from the magnetic disk (1) and pressed toward the magnetic disk (1) by the suspension (4), the suspension (4) being held by a slider holding mechanism, the magnetic-disk-side detection element (12) being attached to the magnetic disk (1) to detect vibration of the magnetic disk (1), the slider-side detection element (12b) being attached to one of the slider (2), the suspension (4) and the slider holding mechanism, wherein

the method comprises:

obtaining a time difference between a maximum value of the detection output from the magnetic-disk-side detection element (12) and a maximum value of the detection output from the slider-side detection element (12b);

determining a condition of contact between the slider (2) and the magnetic disk (1);

evaluating intensity of the contact between the slider (2) and the magnetic disk (1); and

detecting vibration due to the contact between the slider (2) and the magnetic disk (1) out from a plurality of kinds of vibration.

2. The contact inspection method according to claim 1, wherein effective values of the detection outputs from the magnetic-disk-side detection element (12) and the slider-side detection element (12b) are calculated based on the detection outputs from the respective detection elements, and the time

difference is obtained based on the calculated effective values of the detection outputs.

3. The contact inspection method according to claim 1, wherein envelopes of the detection outputs from the magnetic-disk-side detection element (12) and the slider-side detection element (12b) are calculated based on the detection outputs from the respective detection elements, and the time difference is obtained based on the calculated envelopes of the detection outputs.

4. The contact inspection method according to claim 1, wherein the detection output from the magnetic-disk-side detection element (12) is connected to a rotary transformer (33h) fixed to the magnetic disk (1), and the rotary transformer (33h) has an input impedance which is higher than the impedance of the detection element (12) in at least a portion of an effective sensitivity band in which the detection element (12) has a sensitivity not lower than 1/10 of its maximum sensitivity.

5. The contact inspection method according to claim 4, wherein when the impedance of the detection element (12) is Z1 and the input impedance of the rotary transformer (33h) is Z2, $Z2 > 0.5 \times Z1$ is established at the lower limit frequency of the effective sensitivity band.

6. The contact inspection method according to claim 4, wherein when the impedance of the detection element (12) is Z1 and the input impedance of the rotary transformer (33h) is Z2, $Z2 > Z1$ is established at a frequency at which the detection element has the maximum sensitivity.

7. The contact inspection method according to claim 4, wherein an electrical circuit including the detection element (12) and a rotor-side coil (33g) of the rotary transformer (33h)

has a resonance frequency within the effective sensitivity band of the detection element (12).

8. The contact inspection method according to claim 4, wherein an electrical circuit including the detection element (12) and a rotor-side coil (33g) of the rotary transformer (33h) has a resonance frequency within a range in the effective sensitivity band in which the piezoelectric element (12) has a sensitivity not less than 1/10 of its maximum sensitivity.

9. A contact inspection device comprising:

a rotating magnetic disk (1);

a slider (2) having a head for performing at least one of recording and reproduction on and from the magnetic disk (1) and pressed toward the magnetic disk (1) by a suspension (4);

a slider holding mechanism for holding the suspension (4);

a magnetic-disk-side detection element (12) attached to the magnetic disk (1) and detecting vibration of the magnetic disk (1); and

a slider-side detection element (12b) attached to one of the slider (2), the suspension (4) and the slider holding mechanism;

the contact inspection device inspecting vibration conditions of the magnetic disk (1), the slider (2) and the suspension (4), based on detection outputs from the magnetic-disk-side detection element (12) and the slider-side detection element (12b), wherein

the contact inspection device further comprises a measurement device for obtaining a time difference between a maximum value of the detection output from the magnetic-disk-side detection element (12) and a maximum value of the detection output from the slider-side detection element (12b) in order to detect vibration due to contact between the

slider (2) and the magnetic disk (1) out from a plurality of kinds of vibration.

10. The contact inspection device according to claim 9, further comprising a mechanism for directly loading the slider (2) onto the magnetic disk (1) or directly unloading the slider (2) from the magnetic disk (1), wherein the measurement device performs measurement in a direct loading process or direct unloading process.

11. A contact inspection device comprising:

a magnetic disk (1) fixed on a rotary holding mechanism (3) and rotated;

a slider (2) having a head for performing at least one of recording and reproduction on and from the magnetic disk (1); and

a detection element (12) attached to the rotary holding mechanism (3) and detecting vibration of the magnetic disk (1);

the contact inspection device inspecting vibration conditions of the magnetic disk (1), based on detection output from the detection element (12), wherein

the rotary holding mechanism (3) has a magnetic disk fixing portion constituted by an AE transmission flat plate (11) parallel to the magnetic disk (1) surface, and the detection element (12) is fixed on a surface of the AE transmission flat plate (11) opposite from the magnetic disk contact surface.

12. The contact inspection device according to claim 11, wherein the detection output from the magnetic-disk-side detection element (12) is connected to a rotary transformer (33h) fixed to the magnetic disk (1), and the rotary transformer (33h) has an input impedance which is higher than the impedance of the detection element (12) in at least a portion of an

effective sensitivity band in which the detection element has a sensitivity not less than 1/10 of its maximum sensitivity.

13. The contact inspection device according to claim 11, wherein the AE transmission flat plate (11) and the magnetic disk (1) are maintained in pressure contact with each other by a device for fixing the magnetic disk (1) to the rotary holding mechanism (3).

14. The contact inspection device according to claim 11, wherein the magnetic disk contact surface of the AE transmission flat plate (11) has a surface roughness that is substantially the same as that of the surface of the magnetic disk.

15. The contact inspection device according to claim 11, wherein the surface roughness of the magnetic disk contact surface of the AE transmission flat plate (11) has a surface roughness of which average roughness is not more than 5 nm.

16. The contact inspection device according to claim 11, wherein a fluid film is applied at least to the magnetic disk contact surface of the AE transmission flat plate (11).

17. The contact inspection device according to claim 16, wherein the fluid film has a thickness that is larger than the surface roughness of the magnetic disk contact surface.

18. The contact inspection device according to claim 11, wherein a same lubricant is applied to the magnetic disk surface and the magnetic disk contact surface of the AE transmission flat plate (11).